



Iowa Department of Natural Resources  
Flood Plain Management Program

FPID# \_\_\_\_\_

**Applying for a Flood Plain Permit  
Stream Bank Protective Devices**

To obtain a DNR Flood Plain Permit for your project, you must submit to this Department the following checklist and the supporting documentation itemized on this checklist. **Applications submitted without this information will be considered incomplete and will not be reviewed.**

- ☐ Completed DNR Form 542-1018 – “Determining If a Flood Plain Permit is Required – Stream Bank Protective Devices”.
- ☐ Completed and signed DNR Form 36, *Joint Application Form – Protecting Iowa Waters*.
- ☐ Completed document - " Gaining Approval for Stream Bank Protective Devices " – attached
- ☐ Two sets of engineering plans for the project. Please note that the plans must be prepared and certified by a professional engineer licensed in the State of Iowa.
- ☐ Completed and signed certification stating that the engineering calculations and analysis, if applicable, were prepared by a professional engineer licensed in the State of Iowa.

Reviewer's Notes:

# Gaining Approval for Stream Bank Protective Devices

Date: \_\_\_\_\_  
Completed By: \_\_\_\_\_

**1. Application:** Completed and signed Joint Application Form Submitted (required)? ☐ Yes ☐ No

Please indicate if the project site is within the incorporated limits of a city by using the word 'in' when listing the city in Item 7 of the application. The application can be found online at the following link.  
<http://floodplain.iowadnr.gov/>

A copy of the application and supporting documentation must be sent to:

- Iowa DNR, Flood Plain Permit Program
- Iowa DNR, Sovereign Lands (Submit with the copy for the Flood Plain Management Program)
- U.S. Army Corps of Engineers (Submit to the address listed in the instructions)

Applicant Name:						
Location (in Quarter-Section-Tier-Range format):		Qtr.	Sec.	T	N	R
County:		Stream(s):				

**2. Engineering Plans:** Two sets of certified plans submitted? ☐ Yes ☐ No

**Note:** A pre-application consultation with the Iowa DNR to discuss the level of design necessary for your project can be scheduled by calling (866) 849-0321.

The Engineering plans must be at a suitable scale for the features that they are portraying and printed on paper no smaller than 11" x 17". The plans must include the project name, the engineer's address and phone number, a bar scale, a legend for symbols and abbreviations, and a revision box. Technical plan information should include, but is not limited to, the following information.

- ☐ Location map (topographic maps available at: <http://ortho.gis.iastate.edu/>)
- ☐ A site plan showing the proposed structure, obstruction or deposit, the stream, property lines and ownership, borrow site (if on the flood plain), roads, buildings and any other pertinent physical features.
- ☐ At least one stream valley cross section taken perpendicular to the direction of flow through the project area representing typical conditions. The structure, obstruction or deposit should be depicted on the cross section. Extend the cross section beyond the project boundaries to where natural ground will be undisturbed. Additional cross sections may be required depending on the lineal extent of the project and whether there are natural or artificial control sections on the flood plain. **Note:** You may call (866) 849-0321 for assistance in determining the number and location of the required stream valley cross sections. The cross section location(s) must be included on a site plan.
- ☐ Table(s) of stream valley cross section coordinates (in station – elevation format).
- ☐ A stream slope based on a minimum of two survey shots taken a sufficient distance apart (at least 500 feet) to represent the stream slope within the reach.
- ☐ Construction specifications, when applicable.
- ☐ Elevation reference datum: \_\_\_\_\_ (NGVD29, NAVD88, other – explain and include benchmark description.)

### 3. Hydraulics & Hydrology:

**Note:** A pre-application consultation with the Iowa DNR to discuss the level of design necessary for your project can be scheduled by calling (866) 849-0321.

Does the community have a detailed Flood Insurance Study (FIS)? ☐ Yes ☐ No

*(If "Yes" continue with Section 3.a. If "No", Skip to Section 3.b, "If No Detailed FIS Exists for This Stream")*

#### a. Detailed FIS Exists for This Stream

Does the study include detailed information (floodway and 100-year flood elevation) for this stream?  
☐ Yes ☐ No

*(If "No", Skip to Section 3.b, "If No Detailed FIS Exists for This Stream").*

If the proposed project is located within the floodway as delineated in the FIS, it will be necessary to provide hydraulic modeling showing that the project will result in "no-rise" (i.e., less than 0.00 feet increase) in the "100-year" flood profile. To that end, you must follow the steps below for hydraulic modeling.

Was original hydraulic model obtained from the FEMA library? *(For instructions on how to order study data from the FEMA Library, see [http://www.fema.gov/plan/prevent/fhm/st\\_order.shtml](http://www.fema.gov/plan/prevent/fhm/st_order.shtml))*

☐ Yes ☐ No

If "No", Explain: \_\_\_\_\_

If "No", what is source of information? \_\_\_\_\_

When analyzing the effects of a project where a detailed Flood Insurance Study (FIS) exists, the following series of hydraulic models should normally be performed in the specified order to create a "base" condition. Please check that these runs were done in the order listed:

Step #1) ☐ Original hydraulic model as received from FEMA.

Step #2) ☐ Original hydraulic model with corrections made.

Step #3) ☐ Corrected model with additional cross-section(s) located at the project site.

Step #4) ☐ Model from Step #3 with the project included.

The model resulting from Step #3 will be the "base" condition and will be used to determine the effects of the project on flood stages (e.g., backwater) when compared to the "proposed" conditions model. *(Note: The hydraulic models specified above are the minimum needed to analyze the effects of the project on flood stages when a project is located within the delineated floodway. Additional modeling may be required.)*

A summary table should be prepared that shows the relevant water surface elevations (WSEL) at each model cross section for each of the relevant runs/plans: e.g., Effective FIS Base Model, Effective Base with Corrections, Effective Base with Corrections and Additional Cross Sections (Existing Conditions Model), Proposed Conditions Model, etc. The table shown below should be used to document WSELs. If additional cross sections need to be shown or if additional information is needed within the table, please attach a separate table to this document.

Provide electronic files, including input and output tables, on a disk. Label all models according to corresponding steps as listed above. Provide a brief hydrology and hydraulics summary report explaining and justifying each of the steps taken to modify the respective models in steps 2 through 4.

Cross section Number or Label	WSEL As Published in the FIS	WSEL Effective FIS Base Model (Step #1)	$\Delta$ WSEL FIS - (1)	WSEL Effective Base with Corrections (Step #2)	$\Delta$ WSEL (2) - (1)	WSEL Effective Base w/Corrections and Additional Cross Sections (Step #3)	$\Delta$ WSEL (3) - (2)	Proposed Conditions Model (Step #4)	$\Delta$ WSEL (4) - (3)

Have all of the referenced hydraulic models been submitted on disk or electronically?

☐ Yes ☐ No

**After completion of the Above Section, Skip to Section 4, "Approval"**

**b. If No Detailed FIS Exists for This Stream**

Hydrology: Design flood, e.g., 100-yr flood, other

Frequency \_\_\_\_\_ Discharge \_\_\_\_\_

Source of discharge information (Check One):

☐ USGS Regional Equations Report 87-4732

☐ USGS Regional Equations Report 00-4233

☐ Corps Study

☐ WRC 17B analysis of Gage Data

☐ Nearby Flood Insurance Study

☐ Other (Explain) \_\_\_\_\_

Stream Slope: \_\_\_\_\_ ft. /ft. \_\_\_\_\_ ft. /mi.

Source (topo map, \*survey, other): \_\_\_\_\_

*\*(Note: If a surveyed profile is used to determine stream slope, the profile should be of sufficient length (at least 500 feet) to represent the stream slope within the reach.)*

Method of Hydraulic Analysis (Check One):

☐ HEC-RAS/HEC2 (Disk with input/output included? ☐ Yes ☐ No)

☐ Iowa DOT Bridge Backwater (Disk with input/output included? ☐ Yes ☐ No)

☐ Other (list) \_\_\_\_\_

☐ Rating curve included? ☐ Yes ☐ No

☐ Backwater (surcharge) calculations included? ☐ Yes ☐ No

Mannings "n" Values:

Provide justification for all "n" values used in the model in the space below or within an attached hydraulic summary report:

#### 4. Approval:

As outlined in Iowa Administrative Code 567-72.9, the following criteria shall apply to stream protective devices.

**72.9(1) Overflow.** Stream protective devices shall be constructed in a manner which will not cause premature overbank flow.

**72.9(2) Velocity.** Increased velocities resulting from the construction, operation, and maintenance of stream protective devices shall be limited so as not to cause excessive scour in the channel as determined by the department.

**72.9(3) Stability.** Stream protective devices shall be anchored securely to the bank or constructed in a stable manner so as not to become dislodged and result in the scattering of debris in adjacent and downstream reaches.

**72.9(4) Water quality and aesthetics.** Stream protective devices shall not adversely affect the water quality, fish and wildlife habitat or aesthetics of the stream.

Does the Project Satisfy All Criteria? ☐ Yes ☐ No

If no, provide explanation: \_\_\_\_\_

#### NFIP "No-Rise" Certification Criteria:

On a stream with a detailed FIS, FEMA requires that any structure, obstruction or deposit that is located within the delineated floodway must result in "no-rise" (i.e., 0.00 feet increase) in the "100 year" flood profile when compared to the "base condition" model (see modeling process previously outlined in Section 3.a.). A certification of "no-rise" must be included in with the application if the project is within the delineated floodway.

#### 5. Additional Requirements for Stream Bank Protective Devices:

##### 5a. The following requirements shall be considered in the design of revetment projects.

- ☐ The armoring (revetment) material should consist of a mixture of sizes so as to form a dense, interlocking blanket.
- ☐ Armoring (revetment) material shall be placed on the existing or a prepared stream bank with a finished slope of no steeper than 1.5 feet horizontal to 1 foot vertical (1.5H: 1V).
- ☐ The armoring (revetment) material shall be placed so that the resulting channel cross-section is not more restrictive than the adjacent natural upstream and downstream channel cross section. The placement of armoring material into isolated scour hole areas may exceed the maximum thickness limitation of 3 feet as long as the material does not obstruct the channel.
- ☐ Any spoil material resulting from stream bank shaping must be disposed outside the flood plain in a non-wetland location.
- ☐ The armoring (revetment) material shall not extend vertically above the adjacent top of bank.

##### 5b. The following requirements shall be considered in the design of jetty projects.

- ☐ Jetties shall be designed by a professional engineer licensed in the State of Iowa.
- ☐ The jetty structure shall extend into the stream no greater than 25% the distance of the channel width.
- ☐ The finished side slopes of the jetty shall be no steeper than 2 feet horizontal to 1 foot vertical (2H: 1V).
- ☐ The jetty structure shall be keyed onto the bank.
- ☐ The width of each jetty should be 8 to 12 feet.
- ☐ The height of the jetty should be the height of the bank.
- ☐ The jetty structure must be designed so that it shall not cause: premature bank overflow, excessive scour in the channel, will not become dislodged and result in the scattering of debris in adjacent and downstream reaches, and will not affect the water quality, fish and wildlife habitat or aesthetics of the stream.

## Summary of Engineering Data Stream Bank Protective Devices

Applicant(s): \_\_\_\_\_

Location:   Qtr                      Sec                      T            N            R                      County \_\_\_\_\_

Stream(s): \_\_\_\_\_

Drainage Area: \_\_\_\_\_ sq. mi.

Stream Slopes: Reach \_\_\_\_\_ ft./ ft. \_\_\_\_\_ ft./ mi. Source \_\_\_\_\_

                    Main-Channel Slope \_\_\_\_\_ ft./ mi. Source \_\_\_\_\_

Elevation Datum: (ft., ) Local Datum - \_\_\_\_\_ ft.

Channel Bottom \_\_\_\_\_ ft.

Average Floodplain \_\_\_\_\_ ft. (100 year WSE of Top Of Bank, whichever is less)

Top of Bank \_\_\_\_\_ ft.

### Flood Frequency Data:

Design Frequency \_\_\_\_\_ yr.

Discharge\* \_\_\_\_\_ cfs.

Natural Stage \_\_\_\_\_ ft.

Encroached Stage \_\_\_\_\_ ft.

Backwater Due to Project \_\_\_\_\_ ft.

Freeboard (if applicable) \_\_\_\_\_ ft.

### Offsets:

Minimum Calculated Offset \_\_\_\_\_ ft.

Minimum Proposed Offset \_\_\_\_\_ ft.

### \* Source of Discharge Information (check one):

- ☐ USGS Regional Equations Report 87-4732
- ☐ USGS Regional Equations Report 00-4233
- ☐ COE Study
- ☐ WRC 17B analysis of stream gage data
- ☐ Nearby flood insurance study
- ☐ Other (explain) \_\_\_\_\_